Data Power Solutions Quick Start Guide

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This guide is intended to be used in conjunction with the full Install and Operation manual IPN 997-00012-41, available from the documentation pages of the web site www.powerware.com/3com

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Contents

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For Further Information and Technical Assistance

If you do not understand certain parts of this manual, or the install and operation manual on the web site, then please contact your local sales office, who will provide assistance and translation.
إذا كانت أجزاء معينة من هذا الدليل، أو من دليل التركيب والتشغيل المتوفر على موقع الويب غير واضحة لديكم عندئذ يرجى الاتصال بمكتب المبيعات المحلي ، حيث تتوفر المساعدة والترجمة.
如果您对本手册中某些内容或对网站公布的安装和操作手册有不明白之处，请联系当地销售办事处，他们将为您提供帮助和翻译。
Si certaines sections du présent manuel, ou du manuel d'installation et d'utilisation sur le site Internet, vous posent des difficultés, contactez votre revendeur local qui vous fournira l'aide et les explications nécessaires.
Wenn Sie bestimmte Teile dieses Handbuchs oder des auf der Website bereitgestellten Installations- und Betriebshandbuchs nicht verstehen, wenden Sie sich zwecks Unterstützung und Übersetzung bitte an Ihr nächstes Vertriebsbüro.
Se alcune parti di questo manuale o del manuale per l'installazione e operativo presente sul sito Web non sono chiare, contattare l'ufficio vendite locale, che fornirà l'assistenza e le traduzioni necessarie.
Si no comprende ciertas partes de este manual, o del manual de instalación y funcionamiento, disponible en el sitio web, sírvase contactar con la oficina de ventas local, donde le proporcionarán asistencia y ayuda para la traducción.

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General Description

APS3 and APS6 Series (48V) DC Power Systems

APS dc power systems provide high reliability 48V dc power for wiring closet and other data and telecommunications equipment. Each power system includes ac/dc rectifier modules, a supervisory module to provide control and communications functions, circuit breakers to protect the output cabling, and output terminals to connect the cables to the dc powered equipment and optional batteries. Four APS3 and two APS6 dc power system models are available, as shown on the following three pages.

- APS3-058 – rack-mounted version, without battery option
- APS3-059 – rack-mounted version, with battery option
- APS3-060 – desktop version, without battery option
- APS3-061 – desktop version, with battery option
- APS6-058 – rack-mounted version, without battery option
- APS6-059 – rack-mounted version, with battery option

Input: APS dc power systems can be powered by a wide range of ac sources such as single-phase, two-phase, three-phase (L-N) and three-phase (L-L). Depending on the nominal voltage of the ac supply (120V or 240V), the power systems are equipped with either APU48 or APR48 rectifiers. Fused ac sockets (one per rectifier) are available for connecting the power system to the ac supply.

Output: Eight floating dc outlets are available for connecting equipment power cables to the APS dc power system. Each dc outlet is protected by a corresponding 6A or 25A load circuit breaker. Any combination of 6A or 25A rated load circuit breakers (up to a maximum of eight) can be fitted, depending on customer requirements.

Battery Option: External VRLA 48V batteries can be connected to APS3-059, APS3-061 and APS6-059 dc power systems to provide backup power during ac outages. The battery float voltage is temperature compensated.

Access Power Rectifiers

There are three status indicator LEDs on the Access Power Rectifier front panel (Power On, Urgent Alarm and Non-Urgent Alarm).

Two types of fan-cooled, hot-pluggable Access Power Rectifiers are available:

- APU48 – 48 V, 720 W, 120 - 240 V ac
- APR48 – 48 V, 1500 W, 208 - 240 V ac

SM45 Supervisory Module

The SM45 supervisory module is an advanced control and monitoring solution for Access Power Solutions (APS) dc power systems. It provides a full suite of advanced communications options, including built-in Ethernet interface, Web server and SNMP agent. Alarm notifications may be by SNMP traps. The SM45 has an onboard audible indicator and two alarm LEDs.

Low Voltage Disconnect (if applicable)

APS3-059, APS3-061 and APS6-059 dc power systems are equipped with a Low Voltage Disconnect (LVD) module. The LVD disconnects the batteries at the LVD disconnect voltage to prevent damage to the batteries due to excessive deep discharge. After the batteries are disconnected, they recover to their open-circuit voltage. The LVD reconnects the batteries automatically after the ac supply is restored. After the batteries are reconnected, the APS dc power system recharges the batteries and powers the loads.

Both the LVD disconnect and reconnect voltages are configurable. The default LVD disconnect voltage is set to 44V and the reconnect voltage to 48V. This hysteresis band ensures that the open-circuit recovery of the discharged batteries does not rise above the LVD reconnect voltage.

Pre-Installation

Warnings

This section contains important warnings relating to:

- Inputs
- Equipment Classification
- Outputs
- Batteries (if applicable)
- Rectifiers
- Location and Environment
- Servicing
- EMC Compliance

Inputs

- Desktop Versions:
  Pluggable Type A: Except for 120V input, if APS3-06X power systems are fitted with three rectifiers, then only two ac power cords may be connected to one building branch circuit. The third ac power cord must be connected to a separate building branch circuit. Failure to do so voids all safety approvals.
- The maximum earth leakage current of each Access Power Rectifier is 1.5 mA. Ensure that any upstream Residual Current Devices (RCDs) are appropriately rated.
- The ac power cords (supplying the power system) must be suitably rated for the environment and ac power distribution system. In addition, these ac power cords must be approved and installed to comply with local wiring regulations.
- The earth conductor of each ac power cord must have a minimum cross sectional area of 1 mm2 (0.00155 in2).
- The maximum length of each ac power cord should not exceed 3m (10 feet), unless local wiring regulations permit otherwise.
- Ensure that the ac supply is disconnected from those fused ac power sockets before checking or replacing their respective fuses.
- Each socket, K1 to K3 (APS3), and K1 to K6 (APS6), contain two fuses, FS1 and FS2.
  CAUTION: DOUBLE-POLE / NEUTRAL FUSING
- Use only 15 A, 250 VAC, 6.3 x 32 mm, fast-acting fuses of the same type (Bussman ABC-15 or Littelfuse 314-015 Type 3AB) for continued protection against risk of fire.

دخول التيار المتردد

- المنتجات المخصصة للمكاتب: نوع (أ) قابل للتوصيل:
  باستثناء الدخل (ال 120 فولط) إذا كانت أجهزة الطاقة APS3-06X مزودة بثلاثة مقومات، عندها يجب توصيل كابل عدد (2) طاقة تيار متردد فقط لدائرة فرعية واحدة للمبنى. ويجب أن يتم توصيل كبيل الطاقة الثالث بدائرة فرعية مستقلة للمبنى. يعتبر الإخفاق في عمل ذلك بمثابة إلغاء لكافة الإجراءات المعتمدة للسلامة.
- يصل الحد الأقصى لتيار التسرب الأرضي لكل مقوم من مقومات Access Power إلى 1.5 مللي أمبير. تأكد من أن أية أجهزة تيار تسرب ارضي للشبكة (RCDs) قد تم تقديرها بشكل صحيح.
- يجب أن يتم تقدير كبلات طاقة التيار المتردد (التي تغذي نظام الطاقة) بطريقة ملائمة للبيئة وملائمة لجهاز توزيع طاقة التيار المتردد إضافة إلى ذلك، يجب أن تكون كبلات طاقة التيار المتردد هذه معتمدة ومركبة طبقا للقواعد المحلية المعمول بها للتوصيلات.
- يجب ألا تقل مساحة المقطع المستعرض للموصل الأرضي لكل كابل من كبلات طاقة التيار المتردد عن 1 مم2.
- يجب ألا يزيد الحد الأقصى لطول كل كبل من كبلات طاقة التيار المتردد على 3 أمتار ، ما لم تسمح القواعد المحلية للتوصيلات بخلاف ذلك.
- تأكد من أن منبع التيار المتردد قد تم فصله من مقابس طاقة التيار المتردد تلك المزودة بمصاهر قبل التحقق من المصاهر الخاصة بها كل على حدة أو استبدالها.
- يحتوي كل مقبس، بدء من K1 حتى K3 (APS3) ، ومن K1 إلى K6 (APS6)، على مصهرين، المصهر 1 (FS1) والمصهر 2 (FS2).

تحذير: تركيب مصاهر ثنائية القطب Double Pole / Neutral Fusing

- استخدم فقط مصاهر 15 أمبير ، لجهد تيار متردد 250 (VAC)، 6.3 x32 مم، بحيث تكون سريعة الأداء ومن نفس النوع (Bussman ABC-15 أو Littlefuse S14-015 النوع 3AB) لتوفير حماية مستمرة ضد خطر الحريق

交流输入

- 台式安装版：插入式A类：
  如果APS3-06X电源系统配备三个整流器， 除了120V输入外，
  那么只有两条交流电源线可以接到一个建筑物配电支路中。
  第三条交流电源线必须接到单独的建筑物配电支路中。否则， 将失去所有安全许可资格。
- 每个接入电源整流器的最大泄漏电流是1.5mA。确保任一上游剩余电流设备（RCD）都符合规定要求。
- 为电源系统馈电的交流电源线，其规格必须符合环境和交流电源分配系统的要求。此外，交流电源线的认证和安装必须符合当地电源线安装规范。
- 每条交流电源线的接地导体横截面必须至小1 mm2。
- 每条交流电源线的最大长度不应超过3米（除非当地电源线安装规范另有规定）。
- 检查或更换每个保险丝之前，应确保交流电源从电源插座断开。
- K1到K3（APS3）和K1到K6（APS6）每个插座都含有FS1 和 FS2两个保险丝。切记：双极/中性熔断。
- 为了持续性预防火灾，应只使用15 A、250 VAC、6.3 x 32 mm快速动作熔断器（Bussman ABC-15或Littelfuse 314-015 Type 3AB）。

Entrées Alimentation Secteur

- Versions ordinateur de bureau : Enfichable Type A:
  Hormis pour l'entrée 120V, si les systèmes d'alimentation APS3-06X sont équipés de trois redresseurs, deux cordons d'alimentation seulement peuvent être connectés au circuit de dérivation de l'immeuble. Le troisième cordon d'alimentation secteur doit être connecté à un circuit de dérivation séparé. Le non respect de ces consignes annule l'ensemble des garanties de sécurité.
- Le courant de fuite maximum, à la terre, de chaque redresseur de puissance d'accès est de 1,5 mA. Vérifiez que les dispositifs à courant résiduel (DCR) en amont sont correctement dimensionnés.
- Les cordons d'alimentation secteur (fournissant le système d'alimentation) doivent être correctement dimensionnés pour l'environnement et le système de distribution CA. De plus, les cordons d'alimentation secteur doivent être approuvés et installés conformément aux réglementations de câblage locales.
- Le conducteur de terre de chaque cordon d'alimentation secteur doit avoir une section minimale d'1 mm2.
- La longueur maximale de chaque cordon d'alimentation secteur ne doit pas dépasser 3 m, sauf disposition particulière de la réglementation de câblage.
- Assurez-vous que l'alimentation électrique CA est déconnectée des prises électriques secteur protégées par fusible avant de contrôler ou remplacer les fusibles de celles-ci.
- Chaque prise électrique, de K1 à K3 (APS3) et de K1 à K6 (APS6), est dotée de deux fusibles, FS1 et FS2. ATTENTION : PROTECTION DOUBLE-POLE / FUSIBLES SUR PHASE ET NEUTRE.
- Pour une protection continue contre les risques d'incendie, n'utilisez que des fusibles à action rapide de 15 A, 250 V CA, 6,3 x 32 mm, de même type (Bussman ABC-15 ou Littelfuse 314-015 Type 3AB).

Wechselspannungs-Eingänge

- Desktop-Versionen: Typ A, steckbar:
  Wenn APS3-06X Stromversorgungsanlagen mit drei Gleichrichtern ausgestattet sind, dürfen an einem Hausstromkreis nur zwei Netzkabel angeschlossen sein (gilt nicht für 120 V Eingangsspannung). Das dritte Netzkabel muss an einem separaten Hausstromkreis angeschlossen werden. Bei Nichtbeachtung werden jegliche Sicherheitszulassungen ungültig.
- Der maximale Erdschlussstrom für jeden Access Power-Gleichrichter beträgt 1,5 mA. Vergewissern Sie sich, dass der Nennauslösestrom für alle vorgeschalteten Fehlerstromschutzschalter (FI-Schalter) korrekt ist.
- Die Nennleistung der Netzkabel (zur Versorgung der Stromversorgungsanlage) muss in Übereinstimmung mit den Umgebungsbedingungen und der Wechselstromversorgungsanlage ausgelegt sein. Darüber hinaus müssen diese Netzkabel gemäß den für Ihr Land gültigen Elektroinstallationsvorschriften zugelassen und installiert sein.
- Der Schutzleiter von jedem Netzkabel muss einen Mindestquerschnitt von 1 mm2 aufweisen.
- Die Maximallänge von jedem Netzkabel darf höchstens 3 m betragen, sofern andere Längen durch landesspezifische Elektroinstallationsvorschriften nicht ausdrücklich zugelassen ist.
- Vergewissern Sie sich, dass die Stromversorgung von den abgesicherten Netzsteckdosen getrennt ist, bevor Sie die zugehörigen Sicherungen überprüfen oder auswechseln.
- Jede Steckdose, K1 bis K3 (APS3) und K1 bis K6 (APS6), umfasst zwei Sicherungen, FS1 und FS2. ACHTUNG: ZWEIPOLIGE BZW. NEUTRALLEITER-ABSICHERUNG
- Verwenden Sie für dauerhaften Schutz gegen Brandentwicklung nur flinke Sicherungen mit 15 A, 250 VAC, 6,3 x 32 mm desselben Typs (z. B. Bussman ABC-15 oder Littelfuse 314-015 Typ 3AB).

Ingressi C.A.

- Versioni desktop: Tipo A inseribile:
ad eccezione dell'ingresso da 120 V, se i sistemi di alimentazione APS3-06X sono dotati di tre raddrizzatori, sarà possibile collegare solo due cavi elettrici C. A. a un unico circuito derivato. Il terzo cavo C. A. deve essere collegato a un circuito derivato separato. La mancata osservanza di questo punto rende nulle tutte le eventuali approvazioni per la sicurezza.
- La corrente di dispersione a terra massima per ogni Access Power Rectifier è di 1,5 mA. Assicurarsi che eventuali dispositivi RCD (Residual Current Device, dispositivo di corrente residua) a monte presentino la tensione appropriata.
- I cavi elettrici C.A. (che alimentano il sistema elettrico) devono presentare la tensione adeguata all'ambiente e al sistema di distribuzione elettrica C.A. Inoltre, tali cavi elettrici devono essere approvati e installati in modo tale da essere conformi alle normative locali sui collegamenti elettrici.
- Il conduttore di messa a terra di ogni cavo elettrico C.A. deve avere una sezione trasversale minima di 1 mm2.
- La lunghezza massima di ogni cavo elettrico C.A. non deve superare i 3 m, ad eccezione del caso in cui le normative locali sui collegamenti elettrici prevedano diversamente.
- Assicurarsi che l'alimentazione C.A. sia scollegata dalle prese di alimentazione C.A. dotate di fusibili, prima di controllarne o sostituirne i relativi fusibili.
- Ogni presa, da K1 a K3 (APS3) e da K1 a K6 (APS6), contiene due fusibili, FS1 e FS2. ATTENZIONE: POLO DOPPIO / FUSIBILE NEUTRO
- Utilizzare solo fusibili da 15 A, 250 V C.A., 6,3 x 32 mm, ad azione rapida dello stesso tipo (Bussman ABC-15 o Littelfuse 314-015 Tipo 3AB) per una protezione continua rispetto al rischio di incendio.

Entradas CA

- Versiones de escritorio: Con enchufe tipo A:
Excepto para la entrada de 120V, si los sistemas de energía APS3-06X están instalados con tres rectificadores, solo dos cables de alimentación CA se podrán conectar a un circuito derivado del edificio. El tercer cable CA deberá conectarse a un circuito derivado diferente del edificio. Si no lo hace, se anularán las aprobaciones de seguridad.
- La máxima corriente de fuga a tierra de cada uno de los rectificadores Access Power es de 1,5 mA. Asegúrese de que los equipos de corriente residual (RCD) tengan una capacidad nominal adecuada.
- Los cables CA (los que suministran el sistema de energía) deberán tener una capacidad nominal adecuada para el medioambiente y el sistema de distribución de energía CA. Además, dichos cables CA deberán ser aprobados e instalarse de acuerdo con las disposiciones locales referidas al cableado.
- El conductor a tierra de cada cable CA deberá tener un área de sección transversal mínima de 1 mm2.
- La longitud máxima de cada cable CA no deberá exceder los 3 m, a menos que lo permitan las disposiciones locales referidas al cableado.
- Asegúrese de que el suministro CA esté desconectado de las tomas CA con fusibles antes de verificar o reemplazar los fusibles correspondientes.
- Cada toma, K1 a K3 (APS3), y K1 a K6 (APS6), contienen dos fusibles, FS1 y FS2. PRECAUCIÓN: DOBLE POLARIDAD / FUSIBLE NEUTRO
- Use solamente fusibles de acción rápida de 15 A, 250 VAC, de 6,3 x 32 mm del mismo tipo (Bussman ABC-15 o Littelfuse 314-015 Tipo 3AB) para tener una protección continua contra el riesgo de incendio.

Equipment Classification

APS dc power systems are classified as “Class 1” equipment that must be provided with an earth connected to the “Protective Earthing Conductor” in the building wiring. The earth conductor of each ac power cord must be connected to the “Protective Earthing Conductor” in the building wiring. APS3-06X (desktop versions) are classed as “Pluggable Equipment Type A” and intended for use as “Desktop units”, All other units, APS3-05X and APS6-05X are “Pluggable Equipment Type B” or for “Permanently connection” in host equipment.

Outputs

The dc outlets of an APS dc power system are floating to meet the isolation requirements for powering Power over Ethernet IEEE802.3af compatible devices. In non-Power over Ethernet applications the positive or negative output of the dc outlets can be referenced to earth, if required.

Batteries (if applicable)

- Always install the batteries according to the relevant battery manufacturer's instructions.
- Batteries are powerful sources of energy and present a potential electrical shock and energy hazard. The energy hazard is always present, even if the batteries are not connected. Avoid short circuiting terminals of opposite polarity.
- Batteries are heavy, awkward to handle and can cause personal injury. To prevent back injury, use correct lifting and bending techniques when moving batteries. If the batteries are too heavy to move, request assistance.
- Remove or cover rings, wristwatch and other metal jewelry that might be exposed to battery terminals, before installing batteries.
- Do not wear synthetic clothing when installing batteries.
- Always use insulated tools.
- Only use a clean soft damp cloth for cleaning the batteries. Do not use cleaning detergents or chemicals.
- When unpacking the batteries inspect them carefully for leaks, corrosion and possible damage. Report any damage or other battery related problems immediately to your battery supplier.
- Do not remove the factory-fitted transit insulation covers from the batteries until access to the battery terminals is required.
- Do not place tools, loose cables or metal objects (such as interconnecting bars) on top of batteries.
- Do not drop tools, loose cables or metal objects onto intercell connections or terminals of opposite polarity.
- Only terminate cables and interconnecting bars after confirming that the termination will not create a short circuit.
- Always tighten the battery terminal bolts according to the battery manufacturer's specification. Failing to do so can cause erratic battery performance, possible damage to the battery, and/or personal injury.
- Always ensure that any shrouding supplied with the batteries is correctly fitted to cable connectors.

Rectifiers

- To reduce the risk of electric shock and maintain optimum system cooling, always cover empty rectifier slots with blanking panels (Part Number: IPN 621-05722-63A).
- To avoid electrical shock, do not place hands inside the rectifier shelf.
- Rectifier cases may exceed 100ºC (212ºF), especially after prolonged operation. Use suitable gloves to remove the hot rectifier.
- Do not attempt to disassemble rectifiers. Return them, (in their original packaging) along with the completed Equipment Incident Report, to your local Eaton dc product representative for replacement or repair.

المقومات

- لتقليل خطر الصدمات الكهربائية والمحافظة على افضل وضع لتبريد الجهاز ، يجب دائما تغطية الفتحات الفارغة للمقومات بلوحات تغطية الفتحات (رقم الجزء: IPN 621-05722-63A)
- لتجنب الصدمات الكهربائية ، لا تضع الأيدي داخل رف المقومات.
- قد تتجاوز درجة حرارة علبة المقوم 100 درجة مئوية، وخاصة بعد التشغيل لفترة طويلة. استخدم قفازات مناسبة لإخراج المقوم الساخن.
- لا تحاول فك أجزاء المقومات. أعد المقومات، (في عبوتها الأصلية) مع استكمال تقرير فشل الجهاز (Equipment Incident Report) ، إلى وكيل منتج Eaton DC في منطقتك للاستبدال أو الإصلاح.

整流器

- 为了降低触电风险并保持系统最佳冷却，始终应把整流器盲板（编号：IPN 621-05722-63A）安装到未安装整流器的空位上。
- 为了避免触电，不要把手伸到整流器架内。
- 整流器外壳温度可能会超过100ºC，特别是在长期运行之后。拆取发热整流器时， 应戴上合适的手套。
- 不要尝试拆卸整流器。如果需要更换或修理，应把整流器按照原样打包，连同完整的设备故障报告一起，返回给当地Eaton直流产品办事处。

Redresseurs

- Pour réduire au minimum le risque de choc électrique et garantir un refroidissement optimal du système, obstruez les emplacements vides ne contenant pas de redresseur à l'aide de bouchons (Référence : IPN 621-05722-63A).
- Pour éviter tout risque de choc électrique, ne pas toucher l'intérieur du panneau contenant le redresseur.
- La température des boîtiers de redresseur peut dépasser les 100°C, en particulier après une utilisation prolongée. Utilisez des gants adaptés pour retirer le redresseur si celui-ci est chaud.
- N'essayez pas de démonter les redresseurs. Retournez-les (dans leur emballage d'origine), accompagné du Rapport d'incident rempli, à votre revendeur local de produits électriques Eaton dc (courant continu) pour réparation ou remplacement.

Gleichrichter

- Um das Risiko von Stromschlägen zu minimieren und eine optimale Kühlung der Anlage sicherzustellen, sollten Sie für ungenutzte Gleichrichterplätze stets Blindabdeckungen verwenden (Bestellnummer: IPN 621-05722-63A).
- Zum Vermeiden von Stromschlägen niemals in den Gleichrichterschrank fassen.
- Gleichrichtergehäuse können u. U. über 100° C heiß werden, insbesondere nach längerem Betrieb. Zum Entfernen des heißen Gleichrichters geeignete Handschuhe verwenden.
- Gleichrichter dürfen nicht auseinandergebaut werden. Senden Sie diese zwecks Ersatz oder Reparatur (in der Originalverpackung) mit dem ausgefüllten Fehlerbericht an Ihren zuständigen Eaton-Produktvertreter.

Raddrizzatori

- Per ridurre il rischio di shock elettrico e conservare una refrigerazione ottimale del sistema, coprire sempre gli slot vuoti dei raddrizzatori con pannelli otturatori (numero di parte: IPN 621-05722-63A).
- Per evitare shock elettrici, non inserire le mani all'interno del supporto del raddrizzatore.
- Il contenitore del raddrizzatore può superare i 100º C, in particolare dopo un funzionamento prolungato. Utilizzare gli appositi guanti per rimuovere il raddrizzatore caldo.
- Non cercare di disassemblare i raddrizzatori. Restituirli (nell'imballaggio originale) insieme al report sui problemi dell'apparecchiatura, al rappresentante Eaton dc locale, per un'eventuale sostituzione o riparazione.

Rectificadores

- Para reducir el riesgo de descargas eléctricas y para mantener un enfriamiento óptimo del sistema, siempre cubra las ranuras de los rectificadores con paneles obturadores (Número de pieza: IPN 621-05722-63A).
- Para evitar descargas eléctricas, no ponga las manos dentro del estante del rectificador.
- Las carcasas de los rectificadores pueden exceder los 100ºC, en especial tras periodos de funcionamiento prolongados. Utilice guantes para quitar el rectificador recalentado.
- No trate de desarmar los rectificadores. Devuélvalos (en el embalaje original) junto con el Informe de incidentes del equipo completo, al representante local de productos Eaton dc para su reemplazo o reparación.

Location and Environment

- APS dc power systems (rack-mounted and desktop versions) meet the safety and fire enclosure requirements (as specified in IEC 60950-1, UL 60950-1, EN 60950-1 and AS / NZS 60950.1). Always mount APS3-05X and APS6-05X dc powers systems in 19-inch wide host equipment racks (enclosed or open type) securely bolted to the floor and position the desktop versions (APS3-06X) on a surface that supports the weight (12kg / 26lb) of the power system.
- To maintain optimum system cooling, keep the front and rear of the APS dc power system clear from walls or other equipment. The minimum recommended clearance distance at the front and rear of the APS dc power system is 50 mm (2”). No top and bottom clearance is required.
- The location must provide adequate airflow around the unit, in an atmosphere free from excessive dust, corrosive fumes or conductive contaminants.
- Dust build-up within APS dc power systems may cause premature failure. In dusty environments, either install the power system in a sealed and air-conditioned equipment room, or provide fan assisted filtered air to create a positive pressure environment inside the equipment room. Both options require regular cleaning of the air filters.
- Do not allow water or any foreign object to enter the APS dc power system. Do not place objects containing liquid on top of or near the unit.

Servicing

- Data Power Solutions contain hazardous voltages. Do not attempt to disassemble or service the unit if you are not qualified. Only service personnel of Eaton Corporation's Telecommunications Solutions Division or their authorized service agents are permitted to service the unit.
- If the power system requires servicing other than external battery or rectifier replacement, isolate the unit first, as follows:
  - Unplug the ac supply cords from the ac power outlets.
  - Disconnect the external batteries, by switching off the battery circuit breakers.

الصيانة

- تحتوي Data Power Solutions على فولطية خطيرة. لا تحاول فك أو صيانة الوحدة ما لم تكن مؤهلا لذلك. لا يسمح لأي شخص آخر بصيانة الوحدة فيما عدا طاقم الصيانة بقسم خدمات الاتصالات السلكية واللاسكية لشركة Eaton Corporation أو وكلاء الخدمة المعتمدين لديها.
- إذا كانت هناك حاجة لصيانة نظام الطاقة بخلاف استبدال البطارية الخارجية أو المقوم، قم بعزل الوحدة أولا ، واتبع الإجراءات التالية:
  1. افصل كبلات منبع التيار المتردد من مآخذ طاقة التيار المتردد.
  2. افصل البطاريات الخارجية، عن طريق فصل قواطع الدوائر عن المنبع.

维修

- 数据电源解决方案设备包含危险电压。如果您没有获得维修资格， 请不要尝试拆卸或维修设备单元。只有伊顿公司电讯解决方案部的维修人员或他们授权的维修代理才允许维修设备单元。
- 如果电源系统需要进行的维修不属于外置电池或整流器更换，则应首先隔离设备单元， 步骤如下：
  - 从交流电源插座拔下交流电源线。
  - 关闭电池电路断路器，断开外置电池。

Entretien

- Les solutions Data Power utilisent des tensions dangereuses. Ne tentez pas de démonter ou d'intervenir sur l'appareil si vous n'êtes pas qualifié. Seul le personnel du service de réparation de la division Solutions de Télécommunications d'Eaton Corporation ou leurs agents de maintenance autorisés sont habilités à intervenir sur l'unité.
- Si vous devez intervenir sur le système d'alimentation électrique autrement que pour remplacer le redresseur ou la batterie externe, commencez par isoler l'unité, en procédant de la façon suivante :
  - Débranchez les cordons d'alimentation CA des prises de courant CA.
  - Déconnectez les batteries externes en coupant les disjoncteurs d'alimentation des batteries.

Wartung

- Bei Data Power Solutions-Anlagen liegen gefährliche Spannungen an. Sie dürfen das Gerät ohne entsprechende technische Ausbildung weder auseinanderbauen noch warten. Das Warten des Geräts darf nur durch Wartungspersonal der Telecommunications Solutions Division von Eaton oder durch von Eaton zugelassene Wartungstechniker erfolgen.
- Für andere Wartungsarbeiten als das Austauschen der externen Batterien oder des Gleichrichters der Stromversorgungsanlage isolieren Sie das Gerät zunächst wie folgt:
  - Ziehen Sie die Netzstecker aus der Netzsteckdose.
  - Trennen Sie die externen Batterien, indem Sie die Batterieschutzschalter ausschalten.

Manutenzione

- In Data Power Solutions sono presenti tensioni pericolose. Non cercare di disassemblare o riparare l'unità, se non si è qualificati per farlo. Gli interventi di manutenzione sull'unità sono consentiti esclusivamente al personale di assistenza della divisione Telecommunications Solutions della Eaton Corporation o a eventuali tecnici da loro autorizzati.
- Se il sistema di alimentazione richiede una manutenzione diversa dalla sostituzione della batteria esterna o del raddrizzatore, innanzitutto isolate la prima unità, come indicato di seguito:
  - Scollegare i cavi di alimentazione C.A. dalle prese C.A.
  - Scollegare le batterie esterne, spegnendo gli interruttori della batteria.

Reparaciones

- Las Soluciones de Energía para Datos contienen voltajes peligrosos. No trate de desarmar ni de reparar la unidad si no está capacitado para hacerlo. Solo el personal de reparaciones de la División de Soluciones para Telecomunicación de la corporación Eaton o sus agentes de reparación autorizados podrán reparar la unidad.
- Si el sistema de energía necesita ser reparado, excepto si se trata de reemplazar la batería externa o el rectificador, primero aísle la unidad, como se indica a continuación:
  - Desconecte los cables CA de los enchufes CA.
  - Desconecte las baterías externas, apagando los interruptores de circuito de la batería.

EMC Compliance

- APS dc power systems may be used in close proximity to other electronic equipment provided installation is carried out according to instructions in this manual. However, proper installation and compliance with EMC standards does not guarantee that the APS dc power system will not respond to electromagnetic disturbances, or will not cause interference to other equipment in a particular installation.
- APS3 and APS6 power systems comply with part 15 of the FCC (Federal Communications Commission) rules. Operation is subject to the following two conditions:
  - This device may not cause harmful interference, and
  - This device must accept any interference received, including interference that may cause undesired operation.
- Changes or modifications to APS dc power systems not approved by Eaton Corporation could void FCC authority to operate that equipment.
- APS3 and APS6 power systems have been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.

Inspecting the Equipment and Reporting Damage

- Unpack the APS dc power system and inspect it carefully for possible damage that may have occurred while in transit.
- Next, check the equipment against the packing list (supplied with the equipment) and ensure that you have received the correct type of Access Power Rectifiers (either APR48 or APU48).
- Report any damage or incorrect shipment immediately, using a completed Equipment Incident Report (at the back of this guide) to supply all relevant details. Fax the completed form to your local Eaton dc product representative.
- Keep the original packaging. You will need it if any equipment needs to be returned to your local Eaton dc product representative.

Installation

Mounting the APS DC Power System

Location and Environment

APS dc power systems (rack-mounted and desktop versions) meet the safety and fire enclosure requirements (as specified in IEC 60950-1, UL 60950-1, EN 60950-1 and AS/NZS 60950.1).

- Rack-Mounted Versions: APS3-05X and APS6-05X series dc power systems may be mounted in 19-inch wide host equipment racks (enclosed or open type) securely bolted to the floor.
- Desktop Versions: APS3-06X series dc power systems may be positioned on any surface that supports the weight (12kg/26lb) of the power system.

The location must provide adequate airflow around the unit, (as per Clearance Requirements below) in an atmosphere free from excessive dust, corrosive fumes, or conductive contaminants.

Dust build-up within APS dc power systems may cause premature failure. In dusty environments, either install the power system in a sealed and air-conditioned equipment room, or provide fan assisted filtered air to create a positive pressure environment inside the equipment room. Both options require regular cleaning of the air filters.

Important Notes for Rack Mounted Systems

- If this dc power system is installed in a closed or multi-unit rack assembly ensure that the ambient temperature is less than 40°C.
- Ensure that the air flow is not restricted.
- Ensure that the system's weight is adequately and evenly supported.
- Take note of the maximum ac current stated on the nameplate. Ensure that the ac supply is correctly rated.
- Ensure that reliable earthing is maintained. Carefully check earth continuity from the branch circuit to the dc power system.

ملاحظات مهمة حول الأنظمة المركبة على حامل:

- إذا تم تركيب نظام طاقة التيار المستمر هذا في كبينة مغلقة أو على حامل متعدد الوحدات، يجب التأكد من أن درجة الحرارة المحيطة أقل من 40 درجة مئوية.
- تأكد من عدم وجود عوائق أمام تدفق الهواء.
- تأكد من أن وزن النظام مدعوم بقدر كاف ومتساو.
- يجب الانتباه إلى الحد الأقصى للتيار المتردد الموضح على بطاقة البيانات. تأكد من صحة تقدير منبع التيار المتردد.
- تأكد من إجراء التأريض الجيد. تحقق بعناية من تواصل التأريض بدء من الدائرة الفرعية حتى نظام طاقة التيار المستمر.

机架安装式电源系统重要注意事项：

- 如果此直流电源安装在封闭机架或多单元机架内，应确保环境温度低于40癈。
- 确保气流畅通。
- 确保系统重量受到足够的且均匀的支撑。
- 应记下铭牌标注的最大交流电流。确保交流输入符合规定要求。
- 确保接地可靠。应仔细检查自分支电路到直流电源系统的接地是否连续。

Remarques importantes pour les systèmes montés dans un rack:

- Si le système d'alimentation dc est placé dans un ensemble fermé ou une baies, assurez-vous que la température ambiante est inférieure à 40°C.
- Vérifiez que l'air circule librement.
- Assurez-vous que le poids du système est bien réparti.
- Vérifiez le courant secteur maximum indiqué sur la plaque signalétique. Contrôlez que l'alimentation électrique secteur est correctement dimensionnée.
- Vérifiez le bon état et la fiabilité de la mise à la terre. Contrôlez soigneusement la continuité de la terre depuis le circuit de dérivation jusqu'au système d'alimentation dc.

Wichtige Hinweise für Anlagen mit Schrankmontage:

- Wenn diese Gleichstromversorgungsanlage in einem geschlossenen Gehäuse oder in einem Mehrgeräte-Schrank installiert wird, darf die Umgebungstemperatur 40° C nicht übersteigen.
- Sorgen Sie für ungehinderte Luftzirkulation.
- Das Gewicht des Geräts muss gleichmäßig gelagert und abgestützt sein.
- Beachten Sie den maximalen Wechselstromwert auf dem Typenschild. Die Nennleistung der Wechselstromversorgung muss korrekt sein.
- Eine dauerhaft zuverlässige Erdung muss gewährleistet sein. Überprüfen gewissenhaft Sie den Erdungsdurchgang zwischen Hausstromkreis und Gleichstromversorgungsanlage.

Note importanti per i sistemi montati su rack:

- Se questo sistema di alimentazione dc è installato in un'unità rack chiusa o in un gruppo multiplo, assicurarsi che la temperatura ambiente sia inferiore a 40°C.
- Assicurarsi che il flusso dell'aria non sia ostruito.
- Assicurarsi che il peso del sistema sia adeguatamente e uniformemente supportato.
- Prendere nota della corrente C. A. massima indicata sulla targhetta. Assicurarsi che l'alimentazione C. A. sia corretta.
- Assicurarsi la presenza continua di una messa a terra affidabile. Controllare con attenzione la continuità di messa a terra dal circuito derivato al sistema di alimentazione dc.

Notas importantes referidas a los sistemas de montaje en un rack:

- Si este sistema de energía dc está instalado en un montaje cerrado o para varias unidades, asegúrese de que la temperatura ambiente sea inferior a los 40°C.
- Asegúrese de que el flujo de aire no esté restringido.
- Asegúrese de que el peso del sistema sea adecuado y de que tenga un soporte parejo.
- Tome nota de la corriente de entrada CA máxima establecida en la placa de características. Asegúrese de que el suministro CA tenga una capacidad nominal correcta.
- Asegúrese de mantener una conexión a tierra confiable. Compruebe cuidadosamente la continuidad a tierra desde el circuito derivado al sistema de energía CC.

Clearance Requirements

- All APS dc power systems (rack-mounted and desktop versions) require the following minimum clearances:
- Front and Rear Clearance – 50mm (2”) from walls and other equipment, required for optimum system cooling and access.
- Top and Bottom Clearance – None

Connecting the DC Load Cables

Before you start connecting the dc load and battery cables (if applicable) to an APS dc power system, please read the following DC Installation Practices:

- To easily distinguish between positive and negative load cables, we recommend using cables with different colors (as specified by local wiring regulations). The same applies to battery cables (if applicable).
- To reduce inductive coupling, separate dc load, battery and communications cabling from ac supply cables. If the cables have to cross, run them at right angles to the ac supply cables.
- In order to minimize parasitic cable inductance and reduce electromagnetic interference (EMI), all dc load cables should be routed in close proximity to one another, and large current loops should be avoided. The same applies to battery cables (if applicable).
- Eight dc outlets (labeled 1 to 8) are available for connecting your equipment power cables to the APS dc power system. Each dc outlet is protected by a corresponding 6A or 25A circuit breaker (accessible from the dc distribution at the front). The current rating of the corresponding circuit breaker determines the current rating of a dc outlet. The dc outlets are floating to meet the isolation requirements for powering Power over Ethernet IEEE802.3af compatible devices. In non-Power over Ethernet applications the positive or negative output of the dc outlets can be referenced to earth, if required.

DC Load Cable Specifications

No dc load cables are supplied with APS dc power systems. dc load cables are sized differently, depending on whether you connect to 6 A or 25 A dc outlets. All dc load cables must meet the following specifications and no other cable sizes must be used.

6A dc Outlets:	UL 1015, 18 AWG (1mm), multi-strand cable
25A dc Outlets:	UL 1015, 12 AWG (4mm), multi-strand cable
Cable Length:	3m (10 feet) maximum

APS3-05X and APS6-05X (Rack-Mounted Versions)

1 Strip approximately 10mm (⅜”) of the insulation from the cable ends.

2 Terminate the negative load cable(s) at the (-) terminal block(s) of the dc outlet(s).

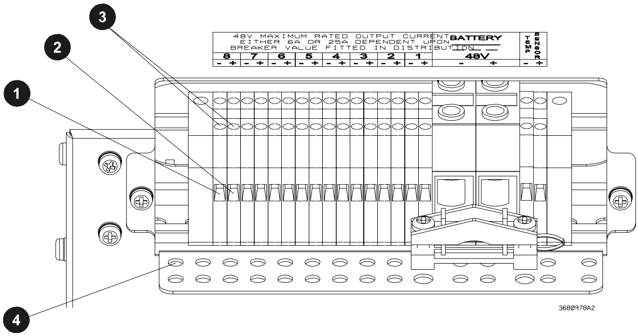
3 Terminate the positive load cable(s) at the (+) terminal block(s) of the dc outlet(s).

> *Ensure that the polarity at the dc outlet(s) matches the power input polarity of your equipment. Connecting reverse polarity equipment power cables to the dc outlets of an APS dc power system might cause damage to your equipment. Such damage is not covered by our warranty.*

> *Ensure that the correct cable sizes have bee used (18AWG for 6A outlets and 12AWG for 25A outlets).*

4 To ensure reliable connections at the terminal blocks of the dc outlets, torque the clamp screws 0.4 – 0.6Nm (3.5 – 5.3 lb-in).

5 Use cable-ties (not supplied) and the provided cable-tie holes on the cable support bracket to tie down the load cables.



APS3-06X (Desktop Versions)

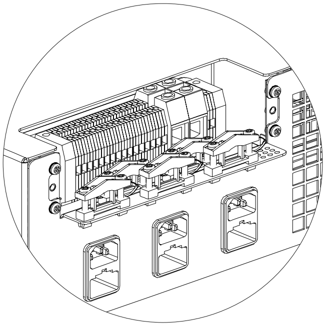
Before proceeding check you have:

- 4 x load cable clamps
- 8 x 25mm blunt ended screws
- 8 x 5mm and 4 x 10mm cable sleeves (50mm long)

> *Depending on the cable sizes, not all sleeves will be required.*

- 1mm^2 (18 AWG) cable for connection to 6A outlets.
- 4mm^2 (12 AWG) cable for connection to 25A outlets.

Step 1- Fit load cable clamps



- Insert the square ends of the load cable clamps into the holes in the back of the system.
- Engage two turns of each retaining screw. This will ensure that the clamp does not move when the wires and sleeves are inserted.

Fit all clamps even if you do not use them all. Tighten unused clamps to prevent access to the dc outputs.

Step 2 – Strip cable ends

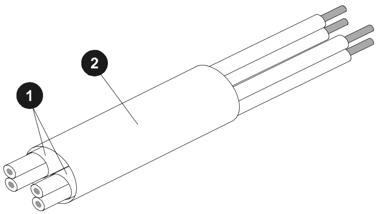
- Strip approximately 10mm (3/8”) from the cable ends. We recommend fitting cable ferrules over the cable ends.

Step 3 – Fit cable and sleeves

To maintain safety approvals insert only the following numbers of cables per clamp, with sleeves where applicable. This will ensure that cables are retained correctly in their clamps.

- Feed the cables through the clamps as follows, depending on cable size.

1mm^2 (18 AWG) – 2 cable pairs* per clamp:



❶ 2 x 5mm sleeves

❷ 10mm sleeve

** If only one cable pair is required then use a dummy pair with sleeves to make up the space.*

4mm^2 (12 AWG) – 1 or 2 cable pairs per clamp.

Step 4 – Terminate cables

- Terminate the negative load cable(s) at the (-) terminal block(s) of the dc outlet(s).
- Terminate the positive load cable(s) at the (+) terminal block(s) of the dc outlet(s).
- Tighten the terminal screws. Required torque: 0.4 – 0.6 Nm (3.5 – 5.3 lb-in).

Ensure that the polarity at the dc outlet(s) matches the power input polarity of your equipment. Connecting reverse polarity equipment power cables to the dc outlets of a power system might cause damage to your equipment. Such damage is not covered by our warranty.

Ensure that the correct cable sizes have been used (1mm2/18 AWG for 6 A outlets and 4mm2/12 AWG for 25 A outlets).

Step 5 – Arrange sleeves and tighten clamp screws

- Arrange the sleeves so that they are all within 10mm (3/8") of the terminals.
- Tighten all cable clamp screws. Required torque: 1.5 – 2Nm (13.2 – 17.7 lb-in).

Tighten the screws of any unused clamps to prevent access to the dc output terminations.

Installing the External Batteries (if applicable)

This section applies to APS3-059, APS3-061 and APS6-059 dc power systems only.

One 48V battery string can be connected to APS3-059 and APS3-061, and up to three 48V battery strings to APS6-059 dc power systems. A 48V battery string consists of either 24 Valve Regulated Lead Acid (VRLA) 2 V cells or four VRLA 12 V monoblocs.

Because of the wide range of battery types and sizes available, we do not supply batteries with the above mentioned power systems and therefore do not cover battery installation in this guide. Always install batteries according to the relevant battery manufacturer's instructions.

Battery Sizing

Battery manufacturers provide various types of information for sizing batteries such as constant current discharge and constant power discharge data. Your battery supplier will be able to assist you with sizing the battery for your application. Before a battery can be sized, the following information is required.

Required backup time, minimum cell voltage (typically 1.83V/cell), load power & operating temperature

In data applications most loads are constant power for a specified backup time. Therefore, for sizing a battery for the required backup time, constant power discharge data should be used.

Batteries for use in North America must be a UL recognized type, category BAZR2.

Battery Location

Valve Regulated Lead Acid (VRLA) batteries emit very small amounts of hydrogen gas into the surrounding atmosphere under normal float charging conditions. For that reason batteries should never be installed in a sealed enclosure or cabinet. Install the batteries in a well-ventilated location to prevent accumulation of hydrogen gas to flammable or explosive levels.

Building air conditioning and ventilation systems already in place for optimum equipment operation and comfort of personnel usually meet or exceed VRLA battery ventilation requirements. For specific battery ventilation requirements, always refer to the battery manufacturer's installation instructions. Avoid:

- Installing the batteries next to any heating source or under air ducts.
- Exposing part of a battery string to direct sunlight.
- Any other locations that would cause temperature variations within the batteries.

Battery Fault Protection

- A fault protection device (such as a circuit breaker or fuse) must be fitted in series with one of the battery cables of each battery string.
- The fault protection device must be:
  - Located as close as practical to the corresponding battery string output terminal, and
  - Capable of disconnecting the potential fault current of the battery string.
- The battery circuit breaker(s) of the power system can not be considered as the fault protection device for the battery string(s) and associated wiring.
- The interrupt rating of the battery circuit breaker(s) fitted within the power systems is 10kA. Therefore, the maximum potential short-circuit current of a 48V battery string must be limited to less than 10kA or the total internal impedance of the battery string should be greater than 5.7mΩ.

  If a smaller rated external fault protection device is used, then batteries with appropriate internal impedance need to be selected.

الحماية من حدوث خلل في البطارية

يجب تركيب جهاز حماية ضدالخلل (مثل قاطع كهربائي أو مصهر) على التوالي بأحد كابلات البطارية لكل مجموعة بطاريات.
فيما يلي الشروط الواجب توفرها ضد استخدام جهاز الحماية ضد الخلل:

- يجب أن يركب جهاز الحماية في أقرب نقطة ممكنة من طرف مخرج مجموعة البطاريات
- ويجب أن يكون الجهاز قادرا على قطع تيار الخلل المحتمل لمجموعة البطاريات.

لا يعتبر قاطع (قواطع) دائرة البطارية لنظام الطاقة بمثابة جهاز حماية ضد الخلل لمجموعة (مجموعات) البطاريات والتوصيلات التابعة.

يبلغ مقنن القطع لقاطع (قواطع) دائرة البطارية المركب داخل أنظمة الطاقة 10 كيلو أمبير.
بناء على ذلك، يجب أن يكون الحد الأقصى لتيار دائرة القصر المحتملة لمجموعة بطارية يبلغ جهدها 48 فولط أقل من 10 كيلو أمبير أو يجب أن يكون إجمالي المقاومه الداخلية لمجموعة البطارية أكبر من 5.7 milli Ω
في حالة استخدام جهاز خارجي للحماية ضد الخلل بمقنن منخفض، عندئذ يجب اختيار بطاريات بمقاومة داخلية ملائمة.

电池故障保护

- 故障保护装置（例如：断路器或保险丝）必须串接在每组电池的一条电缆上。
- 故障保护设备必须：
  - 尽量接近相应的电池组输出终端，并且
  - 能够断开电池组的潜在故障电流。
- 不能把电源系统电池电路断路器认为是电池组和相关引线的故障保护装置。
- 不能把电源系统电池断路器认为是电池组和相关引线的故障保护装置。
电源系统内电池断路器的分断能力额定值是10 kA。 因此，48V
电池组的最大潜在短路电流必须限制到小于10kA， 或者，电池组的内阻必须大于5.7毫欧。

  如果使用较低额定值的外部故障保护装置，则必须选择内阻合适的电池。

10640205 February 2009

Protection en cas de défaut de la batterie

- Un dispositif de protection (tel qu'un disjoncteur ou un fusible) doit être monté en série avec l'un des câbles de batterie de chaque chaîne d'alimentation électrique.
- Ce dispositif de protection doit être:
  - Situé le plus près possible de la borne de sortie de la chaîne d'alimentation électrique correspondante
  - Capable de couper le courant de défaut potentiel de la chaîne d'alimentation électrique.
- Le(s) disjoncteur(s) batterie du système d'alimentation ne peut en aucun cas être considéré comme un dispositif de protection en cas de défaut pour la ou les chaîne(s) d'alimentation électrique et les câbles associés.
- Le pouvoir de coupure du ou des disjoncteur(s) monté(s) sur les systèmes d'alimentation est de 10 kA. Par conséquent, le courant de court-circuit potentiel maximum d'une chaîne d'alimentation électrique de 48V doit être limité à 10 kA maximum ou l'impédance interne totale de la chaîne d'alimentation doit être supérieure à 5,7 mΩ.

  En cas d'utilisation d'un dispositif de protection de défaut externe nominal plus faible, il conviendra de choisir des batteries ayant une impédance interne appropriée.

Batterieschutz

- Eine Batterieschutzvorrichtung (z. B. ein Schutzschalter oder eine Sicherung) muss mit je einem Batteriekabel jedes Batteriestrangs in Reihe geschaltet werden.
- Für die Batterieschutzvorrichtung ist Folgendes zu beachten:
  - möglichst nah am entsprechenden Ausgangsanschluss des Batteriestrangs platzieren
  - muss den potenziellen Fehlerstrom des Batteriestrangs unterbrechen können
- Die Batterieschutzschalter der Stromversorgungsanlage können nicht als Schutzvorrichtung für die Batteriestränge und zugehörigen Leitungen angesehen werden.
- Die Unterbrechungsleistung der in den Stromversorgungsanlagen integrierten Batterieschutzschalter beträgt 10 kA. Folglich muss der maximal mögliche Kurzschlussstrom eines 48 V-Batteriestrangs auf weniger als 10 kA begrenzt sein bzw. der interne Gesamtwiderstand des Batteriestrangs muss größer als 5,7 mΩ sein.

  Wenn eine externe Schutzvorrichtung mit geringerer Nennleistung verwendet wird, müssen Batterien mit einem geeigneten internen Widerstand gewählt werden.

Protezione da eventuali guasti della batteria

- È necessario installare un dispositivo di protezione da guasti (come un interruttore o un fusibile) in serie con uno dei cavi della batteria di ogni stringa di batterie.
- Tale dispositivo deve essere:
  - Posizionato il più vicino possibile al terminale di uscita della stringa di batterie
  - In grado di isolare la corrente per guasto potenziale della stringa di batterie.
- Gli interruttori della batteria del sistema non possono essere considerati come dispositivi di protezione da eventuali guasti per le stringhe di batterie e i cavi associati.
- Il coefficiente di interruzione dell'interruttore della batteria montata nei sistemi di alimentazione è di 10kA. Pertanto, la corrente per cortocircuito potenziale massima di una batteria da 48V deve essere limitata a meno di 10kA oppure l'impedenza interna totale della batteria deve essere superiore a 5,7mΩ.

  Se si utilizza un dispositivo di protezione con una tensione inferiore, è necessario selezionare batterie con l'impedenza interna appropriata.

Protección contra fallos de la batería

- Deberá instalarse un dispositivo de protección (tal como un interruptor de circuito o fusible) en serie con uno de los cables de batería de cada una de las cadenas de batería.
- El dispositivo de protección contra fallos deberá:
  - Estar ubicado lo más cerca posible del terminal de salida de la cadena de batería y
  - Poder desconectar la corriente del fallo posible de la cadena de batería.
- El interruptor (o interruptores) de batería no podrán considerarse como el dispositivo de protección contra fallos para las cadenas de batería y el cableado asociado.
- La capacidad nominal de interrupción de los interruptores de batería instalados dentro de los sistemas de energía es de 10kA. Por lo tanto, la corriente de cortocircuito máxima posible de una cadena de batería de 48V deberá limitarse a menos de 10kA o la impedancia interna total de la cadena de batería deberá ser de más de 5,7mΩ.

  Si se utiliza un dispositivo de protección externo contra fallos con una capacidad nominal inferior, deberá seleccionar baterías con una impedancia interna adecuada.

Connecting the Battery Cables (if applicable)

This section applies to APS3-059, APS3-061 and APS6-059 dc power systems only.

Before You Start

Ensure that all the circuit breakers at the front of the APS dc power system and the external battery circuit breaker (close to the battery output terminals) are switched OFF.

- Before proceeding check you have:
- Battery cable clamp(s) one for APS3 models, three for APS6-059
- 2 x 25mm blunt ended screws per clamp
- 1 x 16mm sleeve (50mm long) per clamp
- Battery cable (see specification below)

Battery Cable Specifications

No battery cables are supplied with APS3-059, APS3-061 and APS6-059 dc power systems. All battery cables must meet the following specifications and no other cable sizes must be used.

Cable Style and Size:	UL 1283*, 4AWG (25mm), multi-strand cable
Cable Length:	3m (10 feet) maximum

**Required to maintain approval compliance.*

Step 1 – Prepare cable clamp

- Cut off the two inside posts of the battery cable clamp to enable the battery cables and sleeve to fit.

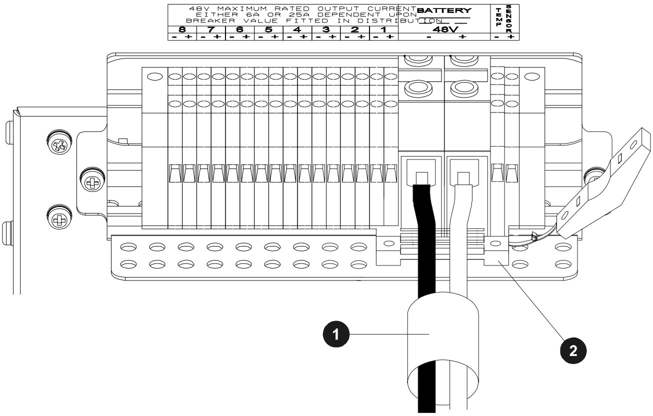
Step 2 – Strip cable and fit sleeve

- Strip approximately 17mm (3/4”) of the insulation from the cable ends. We recommend fitting cable ferrules over the cable ends.
- Feed both battery cables through the 16mm sleeve.

Step 3 – Terminate cable

- Terminate the positive battery cable at the Battery (+) terminal block.
- Terminate the negative battery cable at the Battery (-) terminal block.
- Tighten the terminal screws. Required torque: 2.5 - 3 Nm (22.1 – 26.5 lb-in).

Ensure that the polarity at the battery terminal blocks matches the polarity of the external battery. Connecting a reverse polarity battery to an APS dc power system will cause damage to the rectifier modules. Such damage will not be covered by the warranty.



❶ 16mm battery cable sleeve.

❷ Battery cable clamp with posts removed.

Step 4 – Arrange sleeve and clamp the battery cables

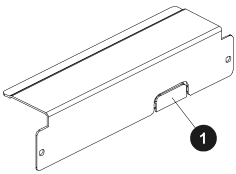
- Arrange the cable sleeve so that it is within 10mm (3/8”) of the terminals.
- Tighten the cable clamp screws. Required torque: 1.5 – 2Nm (13.2 – 17.7 lb-in).

Step 5 – Repeat for other battery cables (if required)

- Repeat the above procedure to connect up to three battery strings to an APS6-059 power system

Step 6 – Remove knockout and fit cover

- Remove the battery cable knockout(s) on the dc output cover:



❶ Battery cable knockout.

- Remove any sharp edges, in particular the remaining knock-out webs.
- Fit the dc output cover.

Installing the Battery Temperature Sensor (if batteries are fitted)

This section applies to APS3-059, APS3-061 and APS6-059 dc power systems only.

Each APS3-059, APS3-061 and APS6-059 dc power system is supplied with a battery temperature sensor and standard 2m (6.5 feet) long cable (factory-fitted to the sensor). Longer cables are available from your local Eaton dc product representative or you can make up your own. We strongly recommend limiting the maximum cable length of the battery temperature sensor to 20m (65 feet) because of noise considerations.

Connecting the Battery Temperature Sensor Cable

There are two screw-clamp terminal blocks at the rear of APS3-059, APS3-061 and APS6 059 dc power systems for terminating the battery temperature sensor cable, the two terminal blocks are labeled TEMP SENSOR (+) and TEMP SENSOR (-).

- Terminate the Black / White wire at TEMP SENSOR (+) and the Black wire at TEMP SENSOR (-).
- To ensure reliable connections at the battery temperature sensor terminal blocks, torque the clamp screws 0.4 – 0.6Nm (3.5 – 5.3 lb-in).
- Use cable-ties (not supplied) and the provided cable-tie holes on the cable support bracket to tie down the battery temperature sensor cable.

  On APS3-061 dc power systems, there is a hole on the battery cable clamp bracket, to tie down the battery temperature sensor cable.

Mounting the Battery Temperature Sensor

The battery temperature sensor is designed to measure the average ambient temperature around the batteries. It is important to mount the battery temperature sensor at a location that truly reflects the average ambient temperature of the batteries. Attaching the battery temperature sensor to the battery stand (above the middle batteries) may provide the most reliable temperature reading.

If possible, avoid:

- Placing the battery temperature sensor on top of battery cases.
- Attaching the battery temperature sensor to battery cables, terminals or interconnecting bars.
- Exposing the battery temperature sensor to direct sunlight and drafts from the air-conditioning system or open windows.
- Running the battery temperature sensor cable along power or earth cables.

Connecting the APS DC Power System to the AC Supply

APS dc power systems can be connected to single-phase (L-N), two-phase (L-L), three-phase (L-N) and three-phase (L-L) ac supply systems. Fused ac sockets (one per rectifier) are available for connecting the APS dc power system to the ac supply. These fused ac sockets are labeled K1 to K3 on APS3 and K1 to K6 on APS6 dc power systems. AC supply socket K1 powers Rectifier 1, etc. No ac power cords are supplied with APS dc power systems.

AC Supply Requirements

AC Power Cords – The ac power cords (supplying the APS dc power system) must be suitably rated for the environment and ac distribution system. In addition, these ac power cords must be approved and installed to comply with local wiring regulations. (See Specifications on page 28 for ac power cord specifications.) The maximum length of each ac power cord should not exceed 3m (10 feet), unless local wiring regulations permit otherwise.

Desktop Versions – If APS3-06X dc power systems are fitted with three rectifiers, then only two ac power cords may be connected to one building branch circuit. The third ac power cord must be connected to a separate building branch circuit. Failure to do so voids all safety approvals.

Earthing – APS dc power systems are classified as “Class 1” equipment that must be provided with an earth connected to the “Protective Earthing Conductor” in the building wiring. The earth conductor of each ac power cord must be connected to the “Protective Earthing Conductor” in the building wiring.

Earth Leakage Current – The maximum earth leakage current of each Access Power Rectifier is 1.5 mA. Ensure that any upstream Residual Current Devices (RCDs) are appropriately rated.

AC Installation

Install all ac cabling between the ac supply point and the APS dc power system according to the ac supply requirements above, but do NOT switch on the ac supply at this stage.

Commissioning

Inserting the Access Power Rectifiers

Do NOT switch on the ac supply at this stage.

- Step 1 – Unpack the rectifiers and inspect them carefully for possible damage that may have occurred in transit. Report any damage immediately, using a completed Equipment Incident Report (located at the back of this guide) to supply all relevant details. Fax the completed form to your local Eaton dc product representative. Keep the original packaging. You will need this if any equipment needs to be returned to your nearest authorized service agent for replacement or repair.
- Step 2 – Align the rectifier with the burst-out guides in the shelf.
- Step 3 – Push in the rectifier, to avoid injury to your hands, keep your fingers clear. Slowly push in the rectifier, sliding it along the burst-out guides, until it plugs firmly into the backplane connector. Tighten the rectifier retaining screw with a Pozidriv® screwdriver.

Pre-Power-Up Check

Use the checklist below to complete initial checks before progressing further.

- All ac and dc cabling is installed, all cabling is neat and correctly insulated
- dc battery and load cabling has the correct polarity
- All panels are in place and all empty rectifier slots are covered with blanking panels
- The ac supply to the APS dc power system is switched OFF
- All circuit breakers at the front of the APS dc power system are switched OFF
- Batteries (if fitted) are isolated from the APS dc power system

Applying AC Power

- Switch on the ac supply.
- Check that each rectifier starts up and that the green Power On LED is on and both the red urgent and yellow non-urgent alarm LEDs are off. (If not consult the Troubleshooting section in Chapter 7 of the main manual).
- Check that the SM45 supervisory module has powered up and that the green Power On LED on both the SM45 and the display module is on.
- Depending on your configuration settings, the urgent and / or non-urgent alarm LED(s) may also be on.
- Check that all installed rectifiers are communicating and that the SM45 supervisory module has correctly registered all rectifiers, by viewing the individual rectifier currents in Main Display Mode. If no load is connected each rectifier will show 0A.

Configuring the APS DC Power System for Operation

Each APS dc power system is supplied with a pre-loaded configuration file.

It is important that the settings of this configuration file are checked / verified and changed as required for site-specific conditions. In particular settings that may affect the performance and life expectancy of the battery must be checked and set according to the battery manufacturer's recommendations. Only those configuration parameters that are most likely to be changed on-site can be configured from the front panel. For entering and editing of all other configuration parameters (such as mapping of alarms to relays and setting up communications) a laptop computer and the latest version of DCTools is required.

The latest version of DCTools can be downloaded from www.powerware.com/downloads.

We recommend using DCTools for configuring your APS dc power system for operation.

Applying DC Power to the Load

- Check the dc output voltage and polarity of the power system and battery string(s).
- Switch on the Battery MCB(s) (if fitted) and check that the Battery Fuse Fail alarm clears.
- When connecting multiple battery strings in parallel to the system dc bus, ensure that the individual strings are of similar voltage.
- Check the Battery Current reading, if batteries are fitted. (The actual value depends on the state of charge of the batteries.)
- Switch on the Load MCB(s). Check that the load (the equipment) powers up and that the Load Fuse Fail alarm clears.
- Check the rectifier currents and verify that the load current is representative of what the load draws and also that the APS dc power system has sufficient capacity.
- Charge the batteries (if fitted) according to the battery manufacturer's recommendations. Manual Equalize can be started from DCTools or the front panel.
- Manual Equalize increases the system voltage to the pre-configured equalize voltage for the pre-configured equalize duration. After the pre-configured equalize duration has expired, the APS dc power system voltage reverts back to normal battery float voltage automatically.
- Fit the dc output cover.

Output Circuit Breaker Field Replacement and Repair

UL Listed Mark

The APS3-058, APS3-059, APS3-060, APS3-061, APS6-058 and APS6-059 series of power supplies have been approved by Underwriters Laboratories Inc and are permitted to carry the UL Listed mark.

Under rules and regulations set by UL, all manufactured units have been subjected to their “Follow Up Service” (FUS) procedure that ensures compliance with the relevant safety standards, that the correct components have been fitted, and appropriate tests have been performed.

To retain the UL mark, only Eaton service engineers, or those persons trained by Eaton, are permitted to replace an output circuit breaker or repair a unit.

Desktop variants APS3-060 & APS3-061

In the field it is not possible for a service engineer to change output circuit breakers on desktop variants APS3-060 or APS6-061.

Battery Input Circuit Breakers

In the field it is not possible for a service engineer to change battery circuit breakers on variants APS3-059, APS3-061 or APS6-059.

Contact Information

- For circuit breaker replacement, or repair, please contact your local Eaton dc Products sales office listed on page 4.

- معلومات الاتصال

لاستبدال قاطع دائرة، أو إصلاحه، الرجاء الاتصال بمكتب مبيعات Eaton المشار إليه في الصفحة رقم

- 4.

联系信息

- 关于断路器的更换或修理的信息，请联系第　4页列出的当地Eaton销售办事处。

Contacts

- Pour remplacer ou réparer un disjoncteur, contacter votre revendeur local Eaton indiqué en page 4.

Kontaktinformationen

- Wenden Sie sich bezüglich Austausch oder Reparatur des Schutzschalters an Ihr nächstes Eaton-Verkaufsbüro (siehe Seite 4).

Informazioni di contatto

- Per la sostituzione degli interruttori o la loro riparazione, contattare l'ufficio vendite Eaton più vicino in base all'elenco a pagina 4.

Información de contacto

- Para reemplazar o reparar los interruptores de circuito, sírvase contactar con la oficina de ventas local de Eaton que aparece listada en la página 4.

Specifications

System Input

Input Voltage		APU48: L-N: 95-275V RMS APR48: L-N: 185-275V RMS
Rated Input Current		
	@ 120V RMS with APU48 rectifiers:	APS3: 21A *(7A per ac power cord)*
		APS6: 42A *(7A per ac power cord)*
	@ 240V RMS with APU48 rectifiers:	APS3: 10.5A *(3.5A per ac power cord)*
		APS6: 21A *(3.5A per ac power cord)*
	@ 208-240V RMS with APR48 rectifiers:	APS3: 24A *(8A per ac power cord)*
		APS6: 48A *(8A per ac power cord)*
IEC AC Cord Sets		
	Cable	Cable rated according to AC voltage (refer to the *Rated Input Current* values) and local wiring regulations.
	Connector 1 (AC supply)	Refer to the *Rated Input Current* values according to AC voltage.
	Connector 2 (Data Power Solution)	IEC type C-13
Frequency Range		45-66Hz
Maximum Earth Leakage Current		1.5mA *(per Access Power Rectifier)*

System Output

Output Voltage (nominal)		48V
Output Power (maximum)		
	APS3-058 and APS3-060:	2.16kW with 3 APU48 rectifiers
		4.50kW with 3 APR48 rectifiers
	APS3-059 and APS3-061:	1.70kW with 3 APU48 rectifiers
		3.00kW with 3 APR48 rectifiers
	APS6-058:	4.32kW with 6 APU48 rectifiers
		9.00kW with 6 APR48 rectifiers
	APS6-059:	3.40kW with 6 APU48 rectifiers
		7.10kW with 6 APR48 rectifiers

Environment

Ambient Temperature Range *(operating)*	-10°C to +40°C [+14°F to 104°F]
Relative Humidity *(operating and storage)*	<95% (non condensing)

Dimensions H, W, D

APS3-058 and APS3-059	3U, 19” mounting, 390mm [15.35”]*
APS3-060 and APS3-061	150mm, 465mm, 415mm [5.9", 18.31", 16.34”]*
APS6-058 and APS6-059	6U, 19” mounting, 390mm [15.35”]*
Access Power Rectifier	3U, 66mm [2.6"], 280mm [11"]

** Additional clear air space is required at rear for rectifier exhaust air venting.*

Weight

APS3	6kg [13 lb]*
APS6	10kg [22 lb]*
Access Power Rectifier	1.9kg [4.2 lb]

** Typical configuration, excluding rectifiers*

Rectifiers

	APR48	APU48
Rated Input Voltage Range	185 - 275 Vrms *Full output up to 50°C [122°F]* 150 - 185Vrms *Full output up to 30°C [86°F]*	95 - 275 Vrms *Full output up to 50°C [122°F]*
Maximum Input Current	10Arms @ 185 Vrms	10 Arms @ 95 Vrms
Rated Output Power	1500W	720W
Rated Output Current	31A @ 48V	15A @ 48V
Preset Voltage	54.5V	54.5V